



EXPLANATION

Quaternary

Alluvial Deposits

Flood plain deposits of the Cumberland River consist of clay and silt, light to medium-gray and yellowish-orange; with lenses of quartz sand and chert sand, gray to brownish-orange, fine to coarse-grained; chert and quartz gravel, gray to yellowish-orange and yellowish to reddish-brown. Thickness as much as 80 feet.

Flood plain deposits of the larger creeks are similar to those of the Cumberland River, except for a lack of quartz pebbles. They consist of unsorted, angular, subrounded chert gravel with clay, silt, and sand. Thickness highly variable.

Devonian and Mississippian

Fort Payne Formation, New Providence Shale, and Chattanooga Shale

Fort Payne Formation
Argillaceous or siliceous limestone and calcareous siltstone, brownish-gray to light olive gray, fine-grained, thin to thick-bedded. Weathers to two markedly different units, an upper serpy chert and a lower bedded chert.

Upper serpy chert consists of masses of banded, fine-grained, rough and porous siltstone and yellowish-brown chert. Upper part of this unit also may contain nodules and beds of streaked fossiliferous chert. Thickness about 100 feet.

Lower bedded chert consists of layers of dark-gray, streaked, fossiliferous chert, which breaks into a rubble of blocks. Partial weathering of the original calcareous siltstone in this zone yields locally a core of medium-gray siltstone surrounded by a yellowish-brown peripheral sand, resembling weathered Hermitage Formation. Thickness about 280 to 400 feet.

New Providence Shale
Shale, medium-gray and greenish-gray with thin zones of reddish-brown at base is olive-gray and light brownish-gray, fine-grained limestone. Thickness 0 to 20 feet. Beneath the New Providence, or at the base of the Fort Payne where the New Providence is absent, is greenish-gray shale or mudstone (Murry Shale) 1 to 4 feet thick containing phosphatic nodules.

Chattanooga Shale
Shale, carbonaceous, grayish-black, fusile, pyritic. Thickness 15 to 18 feet; averages 25 to 30 feet. Mapped separately (M.D.) only in cross sections.

Thickness of Fort Payne, New Providence, and Chattanooga 400 to 500 feet.

Camden, Harriman, and Ross Formations

The Camden and Harriman Formations are lithologically identical, and not enough geographically to be present to form a convenient basis for subdivision. Because exposures of the Ross Formation are scarce, it is mapped with the Camden and Harriman. Combined thickness of Camden, Harriman, and Ross about 100 feet.

Camden and Harriman Formations
These formations consist of siliceous limestones which have been largely replaced by chert. Limestone is gray to light olive-gray, microcrystalline to fine-grained, thin to medium-bedded, siliceous and glauconitic. Chert is light-gray to white with light-gray, yellowish to reddish-brown, and yellowish-gray specks and mottlings (surfaces stained pale to gray yellowish-orange and yellowish-brown), bedded and blocky (beds 2 to 6 inches thick), dense and subconformable, occasional fracture, with white to light-gray tripolitic clay.

Combined thickness of both formations 50 to 95 feet.

Ross Formation
Birdsong Shale Member at top is calcareous shale with thin beds of argillaceous limestone, fine to coarse-grained, very thin to thin-bedded; both lithologies light olive and greenish-gray, clauconitic, fossiliferous. Thickness 15 to 40 feet.

Rockhouse Limestone Member at base is limestone, light olive and greenish-gray to light brownish-gray with pink to reddish-brown grains, fine to coarse-grained and coarsely crystalline, medium-bedded, glauconitic, fossiliferous, with thin shale partings. Thickness 10 to 30 feet.

Thickness of formation about 45 feet.

Devonian

Decatur Limestone

Limestone, gray to light olive-gray, pale-olive, and yellow to greenish-gray with varied concentrations of reddish-brown and reddish-orange grains, fine to coarse-grained (coarse grains prominent), medium to thick-bedded. Shale, pale-olive, moderate yellowish-brown, dark yellowish-orange, and grayish-orange, is present locally as thin partings. Thickness about 70 feet.

Mississippian

Brownsport Formation

Lebelville Member is argillaceous limestone, fine to coarse-grained, very thin to medium-bedded, and calcareous shale, both lithologies light olive-gray to yellowish-gray and dusky-yellow with scattered streaks and mottlings of grayish red-purple, fossiliferous. Thickness 15 to 46 feet.

Bob Limestone Member is light olive-gray to light yellowish-gray, medium to coarse-grained, medium to thick-bedded, with thin partings of light olive-gray argillaceous limestone and shale. Thickness 10 to 20 feet.

Beech River Member is argillaceous limestone, fine to medium grained, thin to medium-bedded, and calcareous shale, both lithologies light olive-gray to yellowish-gray and dusky-yellow with scattered streaks and mottlings of grayish red-purple, fossiliferous. Basal 10 feet consists of light olive-gray and greenish-gray to grayish red-purple, fine to medium-grained, medium-bedded limestone. Thickness of member is 15 to 35 feet.

Thickness of formation about 55 to 75 feet.

Silurian

Dixon Formation

Limestone, argillaceous, grayish-red to dark reddish-brown and grayish-olive to greenish-gray, fine to medium-grained, thin to medium-bedded, with shale and mudstone; shale zone at top about 2 feet thick, upper part light-gray, lower part dark reddish-brown. Formation grades into underlying Lego Limestone. Thickness 40 to 50 feet.

Lego Limestone and Waldron Shale

Lego Limestone is pale to moderate reddish-brown with a few olive-gray and greenish-gray beds, fine-grained with medium to coarse calcite crystals, medium-bedded, evenly bedded. Shale interbeds near top. Thickness 10 to 40 feet.

Waldron Shale is calcareous shale with thin beds of limestone, light olive-gray and greenish-gray, fossiliferous. Thickness probably 2 to 3 feet.

Laurel Limestone

Limestone, light olive-gray to brownish and yellowish-gray, dusky-yellow and reddish-brown, fine-grained with medium to coarse calcite crystals, medium-bedded, evenly bedded, with some dark yellowish-orange argillaceous partings. Thickness 20 to 40 feet.

Osgood Formation

Calcareous shale with thin beds of argillaceous limestone, grayish-red and light to dark reddish-brown, light olive-gray and yellowish-gray. Thickness 20 to 43 feet.

Brassfield Limestone

Limestone, light-gray to light olive-gray and pale-olive to dusky-yellow, fine to coarse-grained, thin to medium-bedded, glauconitic, especially the basal few feet, with lenses of dense chert, thin partings of greenish-gray shale common. Thickness 17 to 21 feet.

Ferris Limestone

Limestone, grayish-yellow and yellowish-orange with pale-orange and pale reddish-orange grains, fine to medium-grained, some beds coarsely crystalline, thin to medium-bedded, irregularly bedded. Thickness 25 to 44 feet.

Hermitage Formation

Shale and limestone, sandy and silty, light to dark-gray (weathers to pale to dark yellowish-brown siltstone and sandstone); limestone is very fine to medium-grained, thin-bedded to laminated. Residuum includes large siliceous masses and fine-grained siliceous material. Thickness 300 to 300 feet.

Stones River Group

In the Central Basin of Tennessee the Stones River Group is subdivided largely on the basis of alternating sequences of thin-bedded and medium-to thick-bedded limestone into the Carthage, Lebanon, Ridley, Pierce, and Murfreesboro Limestones. In the West Creek Basin the Stones River Group exhibits the same alternation of lithologies, but the number and sequence of units are not the same and the individual formations cannot be recognized at many exposures.

Medium to thick-bedded limestone is pale to dark yellowish-brown and yellowish to brownish-gray (weathers light to medium-gray), cryptocrystalline to coarse-grained, with lenses of chert. Thin-bedded limestone is light to medium-gray, pale to dark yellowish-brown and brownish-gray, cryptocrystalline to coarse-grained, contains thin shale partings (in siliceous) that are not everywhere apparent in weathered surface exposures.

Thickness of Group about 1,000 feet.

Knock Dolomite

Dolomite, yellowish and brownish-gray to light olive-gray and dusky-yellow, thin to very thick bedded, microcrystalline to coarse-grained, with a few partings of grayish-green shale, interbedded with limestone, pale-orange to brownish and yellowish-gray and yellowish-brown, fine-grained. Formation intensely brecciated. Exposed thickness at least 600 and possibly 2,000 feet.

Cambrian

Legend:

- Contact, dashed where approximate
- Fault, dashed where approximate, dotted where concealed; U upthrown side, D downthrown side
- Fault, arrow indicates relative movement (shown in cross sections only)
- Strike and dip of beds
- Normal
- Overturned
- Vertical
- Horizontal

GEOLOGIC MAP OF WELLS CREEK BASIN

By
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